Ashley J. Chen

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Education

New York University Shanghai — Expected May 2026

B.S. in Computer Science, Minors in Cybersecurity and Data Science — *GPA: 3.7/4.0*

- **Relevant Coursework**:
  - Data Structures, Algorithms, Discrete Math, Probability and Statistics, Computer Architecture
  - Machine Learning, Operating Systems, Software Engineering, Computer Networking, Databases
  - Penetration Testing, Application Security, Computer Security, Network Security

Research Objective

My research focuses on **security frameworks** for **composable systems**, focusing on **end-to-end guarantees** that ensure security persists across complex, dynamic pipelines. Prior works include prototyping technology for smart contract verification and securing authentic media provenance to combat deepfakes.

Research Experience

Cybersecurity Research Assistant — May 2025 – Present

Columbia University – Advisor: Prof. Xia Zhou — *New York, NY*

- Built a framework to secure speech audio at the point of capture for deepfake prevention, embedding robust physical signatures via echo hiding of real-time transcriptions
- Created a hash chain by echo hiding the previous 3-second window's hashed transcription in the next 3 seconds
- Refactored WhisperFlow (MobiSys '25) for voice activity detection and piped to Python, eliminating silence transcriptions and decreasing word error rate by 30%

Undergraduate Research Assistant — Jun 2023 – Aug 2023

Collaborative Project with Microsoft Research – Advisor: Shuo Chen — *Redmond, WA*

- Prototyped a runtime concolic technology to faithfully verify safety properties of smart contract transactions at scale, demonstrated on Uniswap V2 – one of the most complex smart contract systems
- Created Python symbolic execution engine to translate concrete EVM traces into Boogie verification language
- Enhanced verification efficiency and accuracy with minimal overhead (0.20% on ERC20 and 0.57% on Uniswap V2)
- Conducted in-depth analysis of Solidity compiler files, cutting approx. 25% of nonessential bytecode per trace

Publications (In Preparation)

1. **Theorem-Carrying Transactions: Runtime Verification to Ensure Interface Specifications for Smart Contract Safety**
   Thomas Ball, Nikolaj Bjørner, **Ashley Chen***, Shuo Chen, Yang Chen, Zhongxin Guo, Tzu-Han Hsu, Peng Liu, Nanqing Luo. [arXiv:2408.06478].

* In alphabetical order

Industry Experience

Software Engineer — Oct 2024 – May 2025

NYU Blockchain & Fintech – zkSync Research Team — *New York, NY*

- Optimized Reclaim Protocol SDK smart contracts for zkSync by utilizing zkEVM, reducing gas costs by 10%
- Researched differences between zkTLS providers (MPC, Proxy, and TEE) in terms of protocol and encryption
- Engaged in weekly meetings with zkSync and suggested possible protocol enhancements to support Groth16 ZKP

Developer Success Engineering Intern — Jan 2024 – May 2024

Mantle Network — *Shanghai, China*

- Assisted in resolving 100+ developer support tickets, addressing issues with Ethereum Layer 2 protocols using Jira
- Resolved tickets faster by improving cross-function communication, enhancing overall support efficiency
- Collaborated with cross-functional teams to debug Solidity and Go contracts, documenting performance metrics

Interactive Media Arts Tech Specialist Mar 2023 – Oct 2023
NYU Shanghai Interactive Media Arts Department *Shanghai, China*

- Automated configuration of 20 public MacBooks through MDM software with 50 policies and 10 shell scripts
- Edited, captioned, and voiced-over tech equipment training videos for 100+ students and graduate fellows
- Created detailed 20-page workshop guide and interactive presentation for audio and video equipment

Research Projects

Paillier ZK for Supply Chain Management (Course Project) | *Rust* Nov 2024 – Dec 2024

- Applied Paillier encryption and zero-knowledge proofs to enhance data privacy and security in SCM systems
- Collaborated in a team to implement and test encryption models in Rust, using Git for version control
- Co-authored a comprehensive report analyzing common attack vectors and solutions, highlighting the role of ZKPs

Verbal Reasoning Evaluation for LLMs (Personal Project) | *Whisper, SQL, JavaScript* Jul 2024 – Aug 2024

- Devised a research proposal to evaluate LLM verbal reasoning capability using policy debates and judge feedback
- Automated YouTube audio retrieval and processing to Whisper speech-to-text AI to LLM judge prompt
- Cleaned data for 1,000+ debates, integrating YouTube links for 7 recorded rounds to enhance debater experience
- Scraped and displayed data using FastAPI, Azure SQL Database, and deployed the application on Azure Web App

Network Summarizer Replication (Course Project) | *Python, SQL* Oct 2023 – Dec 2023

- Recreated path optimization from Net2Text (NSDI '18) pseudocode to translate low-level forwarding commands into high-level actionable items for network operators for 250k possible network paths
- Proposed replacing context-free grammar with natural language to allow for increased variability in queries
- Coordinated with three other members to divide and integrate tasks, host weekly meetings, establish workflow

Albert+ (NYUSHDIC Hackathon Project) | *Python, JavaScript, Flask, Next.js* Oct 2023 – Dec 2023

- Revamped NYU course registration platform (Albert) with AI suggestions for future course planning
- Integrated GPT-4 with data from 60 NYU courses to provide recommendations, using Flask and Next.js
- Prototyped a dynamic course scheduler, enabling users to add/drop courses and ensuring conflict-free scheduling

Community Service

Volunteer, Cyber Security Awareness Week (CSAW) Nov 2024

Honors and Awards

Dean's List for Academic Year, NYU Shanghai May 2025
2nd Place & Best Technology Award, NYU Shanghai Digital Innovation Challenge Dec 2023
Conference Attendee, IEEE Women in Engineering China Leadership Summit Oct 2023
Dean's List for Academic Year, NYU Shanghai May 2023

Organizations

Member, Rewriting the Code Aug 2024 – Present
zkSync Research Team, NYU Blockchain & Fintech Feb 2025 – May 2025
Lab Member, NYU OSIRIS Lab Nov 2024 – May 2025
Microsoft Development Team, NYU Blockchain & Fintech Oct 2024 – Dec 2024
Editing Committee Member, NYU Shanghai On Magnolia Square Newspaper Oct 2023 – May 2024
Team Co-Captain, NYU Shanghai Table Tennis Jan 2023 – May 2024

References

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(646) 997-3970, memon@nyu.edu

Xia Zhou, Associate Professor of Computer Science
Columbia University
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